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## **The Impact of Technology on Cash Usage**

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“Cash is dirty ... Cash is heavy ... Cash is inequitable ... Cash is quaint, technologically speaking ... Cash is expensive ... Cash is obsolete.” This is how James Gleick summarises the case against cash. By contrast, electronic means of payment are clean, technologically advanced and supposedly cheap and convenient. Thus, it is not surprising that industry representatives are optimistic that currency will be replaced by technologically more advanced electronic transfers and e-moneys of assorted varieties.

We are sceptical about these predictions. Indeed we believe that currency, notes and coin, may be better protected against fundamental changes induced by IT than many other financial products and mechanisms.

There is no doubt that IT mechanisms for affecting exchanges improve upon currency in some respects, and for some purposes. In many, perhaps most, respects it is more convenient to carry around a single card for small, repetitive purchases (e.g. telephone, subway) than a pocketful of cash. Thus, it does not come as a surprise that cash is seen as an endangered species. However, if IT developments were going to eliminate the use of currency, one might have expected some signs of that to have shown up already in the aggregate data for cash usage. A thorough study of the determinants of cash usage indicates that technological variables have only so far had a small effect on the use of small value notes; even in this case some of the factors, such as the

prevalence of ATMs, appear to have encouraged the use of small notes, so that the overall effect of IT on such holdings is barely visible.

An explanation of this finding has to take the special advantages of cash into account. Convenience is just one of the desirable features of a means of payment. The most important distinction (on our view) between the characteristics of currency on the one hand and e-transfers on the other is that currency is completely anonymous, whereas (at least up till now) e-transfers have facilitated, and proliferated, record-keeping of agents' expenditure patterns. Currency is anonymous in the sense that the recipient of a cash payment neither has to know, nor learns, anything about the counter-party in the process of trade. The only information required is whether the note is genuine or counterfeit. By contrast most e-transfers immediately provide a record of what a customer has bought, i.e. exactly what goods/assets, to two counter-parties, to the seller and to the underlying financial institution.

Even when e-purses are developed, which do not necessitate (but may allow) such information transfers, they must involve electronic equipment. How can users be sure that there will be no record stored on this equipment? Either the actuality, or the suspicion, that e-transfers are subject to recording either by the counter-party (criminals and tax evaders will not trust each other) or by third parties is likely to make such a medium unpopular in those cases where agents wish to leave no tracks of their activities, whether the transfer comes within the grey, black or criminal economies.

Hoarders, moreover, will want both durability and also anonymity. However, in all likelihood, they cannot have both. Given the security concerns analysed below, it cannot be expected that an e-money

issuer can develop a type of anonymous e-money with unrestricted validity. So, even a type of e-money that can be used anonymously in payments (like, for instance, Mondex) is not as good as cash when it comes to hoarding.

A considerable proportion of currency usage is already represented by holders who wish to maintain their activities out of sight of their own government, and/or are dubious about the maintained value of their own government's currency. Currency usage is, to some considerable extent, related to 'bad' behaviour, either individual or governmental. There are few signs that such 'bad' behaviour is on any trend decline, and technical innovations (and informational technology) are not likely to affect such behaviour patterns much in either direction.

In any case the development of e-purses allowing free transferability between users without recourse to the underlying issuers is as yet mainly a theoretical concept, not a practical reality.

Looking at usage figures, one may argue that the main threat for cash comes from debit cards. In recent years debit cards have quickly gained considerable market share in the segment of POS payments. However, if anonymity is as important as we think (see above), debit cards will never completely replace cash. So, the final blow for cash would have to come from other, more cash-like, means of payment. The prime candidate is the e-purse (embedded in a card or a mobile phone).

However, so far, payments with e-purses are of marginal significance. In all countries in which e-purses are used usage per card is small and the cash-substitution effect is negligible. Even in Belgium, a country with one of the most successful e-purse schemes (Proton), there were a

mere 45 million Proton transactions in 1999 - compared with an estimated number of cash transactions of around 4 billion. Even more worrying, in some countries, e-purse use seems to be stagnating or even declining.

Studies of the costs of various payment instruments mostly provide a positive picture for cash. Most studies show that cash still is a highly competitive means of payment. Studies of American, Dutch and German retail organisations found that cash is the cheapest means of payment at the POS.

One reason for the competitiveness of cash may be that from the point of view of the retailer the relevant costs are not just the direct costs of a particular payment device. Retailers are interested in the costs of the entire payment process. A study of the German Retailers Association shows that "speed of payment" is a decisive cost factor and that cash is the fastest means of payment at the point of sale.

Some economists see bank notes as particularly vulnerable to the activities of counterfeiters and claim that the problem of counterfeiting has become so bad that central banks actively encourage the use of electronic substitutes. This assertion is not supported by empirical evidence. As central bank statistics show counterfeiting of bank notes is negligible when compared to the stock of outstanding bank notes.

While counterfeiting is hardly a fundamental threat for currency criminal misuse may well be one for e-purses. In particular for those types of e-purse that promise anonymity, counterfeiting may become a large problem. This has some unpleasant implications for e-purse issuers. The typical e-purse user is no expert in encryption and therefore unlikely to be willing to shoulder the risk of counterfeiting. Therefore,

issuers will have to carry the risk themselves if they want to persuade households and firms to switch to e-purses. This implies that issuing e-purses can be a very risky business.

A fraud case involving magnetic stripe cards in Japanese 'Pachinko' (pinball) parlours illustrated the danger. When gangs stole reading machines and started to copy new value on old cards Sumitomo and Mitsubishi (the card issuers) lost a combined US\$600 million. That is about 15 times the annual value of detected bank note counterfeits in the U.S., Canada and Germany combined.

When assessing the existing security measures, the Bank for International Settlements (BIS) concludes that adequate security for electronic money systems can be achieved. However, as the BIS points out, there is a trade-off in the areas of cost, functionality, speed and reliability. Thus, higher security involves either less seigniorage (maximum balances per card), less convenience and flexibility for the user (restricted offline use, time limits) or higher costs (better storage devices, better cryptography, online authorisation etc.). Thus, security issues may have important implications for costs and revenues.

Users concerned about anonymity will generally prefer to use cash rather than e-money. There are many reasons why people may prefer anonymity – many of which are connected with “bad” behaviour. Black or grey economies as well over-intrusive governments are examples of such behaviour. Black and grey economies will persist in the future. Similarly, governments will continue to “mis-behave”. This implies a powerful source of demand for cash balances.

Electronic money does not have the characteristics of currency. It is not anonymous, and it is not legal tender. Given these special

characteristics, the demise of currency at the hands of information technology will not happen, at least not unless an authoritarian government should decree that it must happen. The fact that such a prospect would terrify anyone with the slightest concern for liberty and freedom among people underlines just how important currency usage is for our way of life, including our `bad' behaviour.